

## An Introduction to the Ant Fauna of Japan, with a Check List (Hymenoptera, Formicidae)<sup>1,2)</sup>

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**Synopsis** The present status of the classification of Japanese ants is briefly reviewed. *Smithistruma habei* is a new synonym of *S. incerta*. *Tetramorium smithi* is new to Japan. A check list of ants of Japan is presented, where 173 living and 1 fossil forms are listed. At least 219 species are considered to be living in Japan, but only 67 species may be identifiable. The number of living species in each genus is given.

### Introduction

The classification of ants of Japan has remained unsatisfactory. No revisionary studies have been accomplished on most genera. There are many undescribed or undetermined species in Japan, and geographical variation has remained unknown for almost all species. Except the species belonging to genera *Stenamma*, *Messor*, *Kyidris*, *Polyergus*, and *Polyrhachis*, most species of Japan may not be identified. The reasons for these unsatisfactory conditions are (1) the difficulty of classification proper, such as the great and complicated variation seen in intracolony and intercolony populations, and (2) the loss or absence of types or reference specimens in Japan.

KUBOTA (1971) presented a check list of the ants of Japan. This is a laborious work and very useful. However, there are several omissions, unpublished synonymies (correct or incorrect), unpublished generic transfer; and, the present status of each form is not mentioned. Moreover, several authors (SONOBE, 1973; TANAKA, 1974; KUBOTA, 1976; SONOBE & DLUSKY, 1977; BARONI URBANI, 1977; BOLTON, 1977; YAMAUCHI, 1979; BROWN & BOISVERT, 1979; SHINDO, 1979) have added a total of 17 species to the ant fauna of Japan since 1971.

There are several reports in which many forms are raised to specific rank without any explanations (HAYASHIDA, 1971, etc; SONOBE, 1971, 1977 a, etc; MORISITA & ONOYAMA, 1974). Such treatments might cause confusions and be obstacles to sound classification.

Correct identification is necessary for biogeographic and ecological studies of

1) Taxonomy and ecology of the ants of Japan, (1).

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ants as well as taxonomic ones themselves. It is needed that revisional works will appear as soon as possible.

Considering the present situation stated above, I have first of all intended to make a conservative but up-to-date check list. Before giving the list, I publish invalid names, a new synonym, and a new species to Japan.

# I. Nomen nudum, New Synonym, and New Record to Japan

## A. Nomen nudum

1. *Aphaenogaster* (*Attomyrme* [!]) *expolitus* AZUMA, 1950: 34. Nomen nudum.

No description follows, this name is therefore apparently invalid.

2. *Leptothorax* (*Lep.*) *arimensis* AZUMA, 1953: 3. Nomen nudum.

Although there is a short description of four lines, "Warera", in which the description appeared, is a school magazine and not a scientific journal.

## B. New synonym

### *Smithistruma incerta* BROWN

*Smithistruma* (*Smithistruma*) *incerta* BROWN, 1949a: 10-12. Female, ergatotype worker. Type locality: Kirishima Mountain, Kyushu (F. SILVESTRI leg., MCZ).

*Strumigenys* (*Cephaloxys*) *japonica* ITO, WHEELER, 1928a: 115-116. Female, worker.

*Smithistruma* (*Smithistruma*) *habei* AZUMA, 1951: 89, fig. A, B. Worker. Type locality: Mt. Minoo, Osaka Pre. (T. HABA leg., AZUMA Coll.). New synonymy. [Holotype examined.]

It is strange that AZUMA (1951) did not mention *S. incerta* in his original description though he gave BROWN (1949 a) as literature. The holotype of *habei* agrees with the original description of *incerta*. The original figures of *habei* has proved incorrect in several points. I compared directly the holotype worker of *habei* with a worker specimen from Minamata, Kumamoto-Ken identified with *incerta* by Prof. W. L. BROWN which was given to me through the courtesy of Mr. M. KUBOTA. There is no morphologically significant difference between the two, though the color of *habei* holotype is a little paler than that of the *incerta* specimen. A dealate female specimen, which was mounted on a triangular card together with the holotype [this female specimen should have been a paratype, but was not mentioned in AZUMA (1951)], is also identical with female specimens of *incerta* from Yamanaka, Shizuoka-Ken. Measurements in mm of the *habei* holotype are as follows: head length, 0.56; head width, 0.38 (thus, cephalic index is 68); WEBER's length of trunk, 0.56; mandibular length, 0.06; scape length, 0.31.

## C. New record

BOLTON published revisionary works on the genus *Triglyphothrix* in the world in 1976 and the genus *Tetramorium* in the Oriental and Indo-Australian regions in 1977. I identified four species of Okinawan ants of these genera in ONOYAMA (1976). *Triglyphothrix striatidens*? (the 41st species in the list of ONOYAMA, 1976) is *Triglyphothrix lanuginosa*, *Triglyphothrix*? (*Tetramorium*?) sp. (42) is *Tetramorium amium* [this species is certainly different from *T. mixtum*, for instance, in

that the basal border of the first gastral tergite is less concave. See BOLTON (1977): 113]. *Tetramorium* sp. A (44) is *Tetramorium simillimum*, and *Xiphomyrmex* sp. (45) is *Tetramorium smithi*. The last species is new to Japan.

*Tetramorium smithi* MAYR

[Japanese name: Kadomune-shiwa-ari ONOYAMA, 1976]

*Tetramorium Smithi* MAYR, 1878: 673. Worker. Type locality: Calcutta (ROTHNEY leg., BMNH, NM-Vienna).

*Tetramorium smithi*, BOLTON, 1977: 90. Worker.

*Xiphomyrmex* sp., ONOYAMA, 1976: 125, 129.

I collected workers walking on relatively open grounds such as road sides at wood margins, and probably under stones. This species was collected only from Naha, and seems to be rare in Okinawa-Ken. I have never obtained it from the other localities.

Material examined: 13, 3, 3, and 6 workers at 4 sites respectively on the campus of University of the Ryukyus, Naha, 26-VI-1974, and 1 worker at another site of the University, 31-III-1975, K. ONOYAMA leg.; 1 dealate and 1 alate females, 6 workers, 3 worker pupae, 1 larva, University of the Ryukyus, 4-V-1975, T. ABE leg.

## II. Check List of the Ants of Japan

Procedures. From more than 400 references on Japanese ants (excluding ants from the Chishima Islands), scientific names were picked up. These names were checked with reference to CHAPMAN & CAPCO (1951) and KUBOTA (1971) not to miss any names and synonymies. From CHAPMAN & CAPCO (1951), 105 forms (counting synonymous names), which are recorded as occurring in Japan, were extracted, 3 forms being excluded: *Aphaenogaster (Attomyrma) rothneyi tipuna* (from Taihoku), *Formica (Formica) pratensis* (from Sakhalin), and *Camponotus (Tanaemyrmex) irritans tincta* var. *volkensis* (misprint of Japan Is. ?).

WHEELER (1928 a) listed 86 available forms. KUBOTA (1971) gave 163 valid names and regarded 132 names as available. It is wrong that ETTERS HANK (1966: 123) wrote the locality of *Oligomyrmex aborensis* as Japan (correctly India). In the following list, I present 173 available names. An equality sign (=) means published synonymy. Every available name is given by its last status, but synonymous names are given by their original ones. References in brackets are those in which the names were first reported from Japan; the forms without references in brackets were originally described from Japan, or were first reported under synonymous names. References in which synonymy was established are also given in brackets with the abbreviated word "Syn.". The species with an asterisk (\*, 67 species) are regarded to be identifiable.

Subfamilial arrangement is somewhat different from that of ONOYAMA (1976): the Myrmicinae is placed next to the Cerapachyinae, and the Leptanillinae next to the Myrmicinae. These changes have been made according to TAYLOR (1978, personal communication), who made important findings in construction of ant phylogeny. Generic and subgeneric arrangements follow ONOYAMA (1976); some

changes might perhaps be made according to KUGLER's (1978) study on the sting apparatus of myrmicine ants, but I have not done here because how to change is not very clear. Nomenclatural and taxonomic changes are made about the subgenera of *Leptothorax* (SMITH, 1950) and formerly the genus *Solenopsis* (BARONI URBANI, 1968). Specific names are arranged in alphabetical order within one genus or subgenus.

### A Check List of the Ants of Japan (October 1979)

#### A. Living species (173 forms)

##### Subfamily Ponerinae (19 forms)

- \*1. *Amblyopone silvestrii* (WHEELER), 1928a: 97.
- 2. *Proceratium itoi* (FOREL), 1917: 717.
- \*3. *Proceratium japonicum* SANTSCHI, 1937: 362.
- \*4. *Proceratium watasei* (WHEELER), 1906: 303.
- 5. *Diacamma rugosum geometricum* var. *anceps* EMERY, 1897: 155. [MATSUMURA & UCHIDA, 1926: 51.]
- \*6. *Odontoponera transversa* (Fr. SMITH), 1857: 86. [TERANISHI, 1929c: 42.]
- 7. *Ectomomyrmex javanus* MAYR, 1867: 84.  
= *Pachycondyla* (*Ectomomyrmex*) *japonica* EMERY, 1902: 31. [Syn. YASUMATSU, 1962: 94.]
- 8. *Ectomomyrmex sauteri* FOREL, 1912b: 49. [TERANISHI, 1933a: 78.]  
= *Ectatomma horni*, SANTSCHI, 1937: 363. [Syn. ONOYAMA, 1976: 135.]
- \*9. *Brachyponera chinensis* (EMERY), 1894: 460.  
= *Ponera solitaria* Fr. SMITH, 1874: 404. [Preoccupied, nec *solitaria* Fr. SMITH, 1860. Syn. BROWN, 1958b: 22.]  
= *Brachyponera luteipes*, IMAI & YOSIDA, 1964: 64.  
= *Brachyponera sinensis*, IMAI & KUBOTA, 1972: 194.
- \*10. *Trachymesopus pilosior* (WHEELER), 1928a: 98.  
= *Euponera* (*Trachymesopus*) *chosonensis* TERANISHI, 1940: 8. [Syn. BROWN, 1963: 8.]
- \*11. *Cryptopone sauteri* (WHEELER), 1906: 304.
- 12. *Ponera excoecata* WHEELER, 1928b: 7. [WHEELER, 1928a: 99.]
- 13. *Ponera japonica* WHEELER, 1906: 306.  
= *Ponera japonica* v. *crocea* SANTSCHI, 1941: 273. [Syn. TAYLOR, 1967: 76.]
- 14. *Ponera nippona* SANTSCHI, 1937: 364.
- \*15. *Ponera scabra* WHEELER, 1928a: 99.
- \*16. *Ponera yakushimensis* TANAKA, 1974: 32.
- 17. *Hypoponera zwalwenburgi* (WHEELER), 1933a: 14. [ABE & MAEDA, 1977: 78.]
- 18. *Leptogenys chinensis* (MAYR), 1870: 965. [DALLA TORRE, 1893: 44.]
- \*19. *Odontomachus manticola* EMERY, 1892: 560.  
= *Myrtoteras kuroi* MATSUMURA, 1912: 191. [Syn. BROWN, 1976: 105.]  
= *Odontomachus manticola* v. *Formosae* FOREL, 1912b: 46. [YANO, 1932: 340.] [Syn. YASUMATSU, 1962: 93.]

##### Subfamily Cerapachyinae (1 form)

- \*20. *Cerapachys birai* FOREL, 1907a: 7.  
= *Cerapachys* (*Syscia*) *silvestrii* WHEELER, 1909: 269. [WILSON & TAYLOR, 1967: 33.] [Syn. BROWN, 1975: 22.]

##### Subfamily Myrmicinae (78 forms)

- 21. *Myrmica kurokii* FOREL, 1907b: 18.

22. *Myrmica kurokii sonticu* SANTSCHI, 1937: 367.
23. *Myrmica lobicornis jessensis* FOREL, 1901a: 371.
24. *Myrmica rubra* (LINNAEUS), 1758: 580.  
 = *Myrmica laevinodis* NYLANDER, 1846a: 927. [FOREL, 1901a: 371.] [Syn. YARROW, 1955: 114.]  
 = *Myrmica ruginodis* var. *ruginodo-laevinodis* FOREL, 1874: 78. [IMANISHI, 1930: 185.] [Syn. BRIAN & BRIAN, 1949: 393.]
25. *Myrmica rubra* var. *silvestrii* WHEELER, 1928a: 100.
26. *Myrmica rubra yoshiokai* WEBER, 1947: 451.
27. *Myrmica ruginodis* var. *kotokui* FOREL, 1911: 267.
- \*28. *Manica yessensis* AZUMA, 1955: 79.
- \*29. *Stenamma nipponense* YASUMATSU & MURAKAMI, 1960: 28.
- \*30. *Stenamma owstoni* WHEELER, 1906: 314.
31. *Aphaenogaster (Attomyrma) famelica* (Fr. SMITH), 1874: 405.
32. *Aphaenogaster (Attomyrma) famelica frontosa* WHEELER, 1928a: 104.
33. *Aphaenogaster (Attomyrma) famelica* var. *osimensis* TERANISHI, 1940: 78.
34. *Aphaenogaster (Attomyrma) famelica ruida* WHEELER, 1928a: 104.
35. *Aphaenogaster (Attomyrma) smythiesi japonica* FOREL, 1911: 267.
36. *Aphaenogaster (Attomyrma) vapida* WHEELER, 1928a: 105.
37. *Aphaenogaster (Attomyrma) verecunda* WHEELER, 1928a: 105.
- \*38. *Messor aciculatus* (Fr. SMITH), 1874: 405.  
 = *Stenamma (Messor) aciculatum* v. *brunneicorne* FOREL, 1901b: 60. [Syn. YANO, 1910: 420.]
39. *Pheidole fervida* Fr. SMITH, 1874: 406.
40. *Pheidole indica* MAYR, 1878: 679. [OKAMOTO, 1957: 39.]
- \*41. *Pheidole megucephala* (FABRICIUS), 1793: 361. [SONOBE, 1973: 15.]
42. *Pheidole nodus* Fr. SMITH, 1874: 407.  
 = *Pheidole nodus* var. *praevexata* WHEELER, 1929: 3. [Syn. YASUMATSU, 1962: 96.]
43. *Pheidole pili* SANTSCHI, 1925: 83. [WHEELER, 1928a: 108.]
44. *Leptothorax (Leptothorax) acervorum* (FABRICIUS), 1793: 358. [MORISITA, 1940: 54.]
45. *Leptothorax (Myrafant) congruus* Fr. SMITH, 1874: 406.
46. *Leptothorax (Myrafant) congruus* var. *spinosior* FOREL, 1901a: 371.
47. *Leptothorax (Nesomyrmex) koreanus* TERANISHI, 1940: 16. [MORISITA, 1945: 25.]
- \*48. *Triglyphothrix lanuginosa* (MAYR), 1870: 972.  
 = *Tetramorium obecum* race *striatidens* EMERY, 1889b: 501. [OKAMOTO, 1972: 14.] [Syn. BOLTON, 1976: 350.]
- \*49. *Tetramorium amium* FOREL, 1912b: 53. [YASUMATSU, 1940: 68.]
- \*50. *Tetramorium bicarinatum* (NYLANDER), 1846b: 1061.  
 = *Tetramorium guineense*, MAYR, 1862, etc. [Misidentification. Syn. BOLTON, 1977: 94.] [TERANISHI, 1927b: 123.]
51. *Tetramorium caespitum* (LINNAEUS), 1758: 581. [FOREL, 1900: 268.]  
 = *Tetramorium caespitum simileve* [!] variety *jacoti* WHEELER, 1923: 3. [WHEELER, 1928a: 115.] [Syn. YASUMATSU, 1962: 96.]
52. *Tetramorium caespitum* var. *japonica* RÖSZLER, 1936: 3.
53. *Tetramorium caespitum tsushimae* EMERY, 1925: 187.
54. *Tetramorium caespitum tsushimaeum* var. *pullum* SANTSCHI, 1941: 277.
- \*55. *Tetramorium kraepelini* FOREL, 1905: 15.  
 = *Tetramorium yanoi* SANTSCHI, 1937: 376. [Syn. BOLTON, 1977: 117.]
- \*56. *Tetramorium nipponense* WHEELER, 1928a: 115.
- \*57. *Tetramorium simillimum* Fr. SMITH, 1851: 118. [SONOBE, 1973: 15.]
- \*58. *Tetramorium smithi* MAYR, 1878: 673. [This report.]

- \*59. *Tetramorium tanakai* BOLTON, 1977: 119.
  - \*60. *Tetramorium tonganum* MAYR, 1870: 972. [BOLTON, 1977: 130.]
  - 61. *Monomorium floricola* (JERDON), 1851: 107. [WHEELER, 1906: 310.]  
= *Monomorium intrudens* FR. SMITH, 1874: 406. [Syn. EMERY in WHEELER, 1906: 310. and EMERY, 1908: 682. See TERANISHI, 1929c: 41.]
  - 62. *Monomorium fassulatum* EMERY, 1894: 465. [SHINDO, 1979: 27.]
  - 63. *Monomorium latinode* MAYR, 1872: 152. [TERANISHI, 1929c: 42.]
  - 64. *Monomorium minutum* MAYR, 1855: 453. [TERANISHI, 1929b: 323.]
  - 65. *Monomorium minutum chinensis* SANTSCHI, 1925: 86. [WHEELER, 1928a: 113.]
  - 66. *Monomorium nipponense* WHEELER, 1906: 310.
  - 67. *Monomorium nipponense* var. *gracilum* TERANISHI, 1940: 29.
  - 68. *Monomorium nipponense* var. *robustum* TERANISHI, 1940: 29.
  - 69. *Monomorium nipponense* var. *satoi* TERANISHI, 1940: 30.
  - \*70. *Monomorium pharaonis* (LINNAEUS), 1758: 580. [TERANISHI, 1928: 241.]
  - 71. *Monomorium triviale* WHEELER, 1906: 311.
  - 72. *Diplarhoptrum fugax* (LATREILLE), 1798: 46. [ANDRÉ, 1903: 128.]
  - 73. *Diplarhoptrum fugax* var. *japonica* (WHEELER), 1928a: 113.
  - 74. *Oligomyrmex sauteri* FOREL, 1912b: 56. [AZUMA, 1951: 87.]
  - \*75. *Vollenhovia emeryi* WHEELER, 1906: 312.
  - 76. *Vollenhovia emeryi chosenuka* WHEELER, 1928a: 113. [TERANISHI, 1933a: 79.]
  - \*77. *Lordomyrma azumai* (SANTSCHI), 1941: 275.  
= *Lordomyrma nobilis* YASUMATSU, 1950: 75. [Syn. BROWN, 1952: 124.]
  - \*78. *Myrmecina graminicola nipponica* WHEELER, 1906: 307.
  - \*79. *Pristomyrmex pungens* MAYR, 1866b: 904.  
= *Pristomyrmex japonicus* FOREL, 1900: 268. [Syn. VIEHMEYER, 1922: 207.]
  - 80. *Cardiocondyla emeryi* FOREL, 1881: 5. [SONOBE, 1972: 179.]
  - 81. *Cardiocondyla nuda* MAYR, 1866a: 508. [SANTSCHI, 1937: 371.]
  - 82. *Cardiocondyla wroughtoni* (FOREL), 1890b: 111. [SHINDO, 1979: 25.]
  - 83. *Crematogaster (Crematogaster) brunnea ruginota* var. *azumai* SANTSCHI, 1941: 275.
  - 84. *Crematogaster (Crematogaster) brunnea teranishii* SANTSCHI, 1930: 265.
  - 85. *Crematogaster (Crematogaster) laboriosa* FR. SMITH, 1874: 407.
  - 86. *Crematogaster (Crematogaster) laboriosa* var. *nawai* ITO, 1914: 41.
  - 87. *Crematogaster (Crematogaster) matsumurai* FOREL, 1901a: 372.
  - 88. *Crematogaster (Crematogaster) matsumurai* var. *iwatensis* SANTSCHI, 1930: 264.
  - 89. *Crematogaster (Crematogaster) matsumurai vagula* WHEELER, 1928a: 110.
  - \*90. *Crematogaster (Orthocrema) sordidula osakensis* FOREL, 1900: 269.  
= *Crematogaster sordidula* var. *japonica* FOREL, 1912a: 339. [Syn. BROWN, 1949b: 37.]
  - 91. *Strumigenys lewisi* CAMERON, 1887: 229.
  - \*92. *Strumigenys solifontis* BROWN, 1949a: 18.
  - \*93. *Quadristruma emmae* (EMERY), 1890: 70. [KUBOTA, 1976: 4.]
  - \*94. *Smithistruma incerta* BROWN, 1949a: 10.  
= *Smithistruma (Smithistruma) habei* AZUMA, 1951: 89. [Syn. This report.]
  - \*95. *Smithistruma rostrataeformis* BROWN, 1949a: 12.
  - \*96. *Pentastroma carina* BROWN & BOISVERT, 1979: 203.
  - \*97. *Weberistruma japonica* (ITO), 1914: 40.
  - \*98. *Trichoscapa membranifera* EMERY, 1869: 24. [MIYAMOTO *et al.*, 1954: 28.]
  - \*99. *Kyidris mutica* BROWN, 1949a: 3.  
= *Polyhomoa itoi* AZUMA, 1950: 36. [Syn. BROWN & YASUMATSU, 1951: 94.]
  - \*100. *Epitritus hexamerus* BROWN, 1958a: 70.
- Subfamily **Leptanilloinae** (5 forms)

- \*101. *Leptanilla japonica* BARONI URBANI, 1977: 460.
- \*102. *Leptanilla kubotai* BARONI URBANI, 1977: 444.
- 103. *Leptanilla morimotoi* YASUMATSU, 1960: 17.
- \*104. *Leptanilla oceanica* BARONI URBANI, 1977: 450.
- \*105. *Leptanilla tanakai* BARONI URBANI, 1977: 458.

## Subfamily Dolichoderinae (7 forms)

- 106. *Dolichoderus sibiricus* EMERY, 1889a: 442. [WHEELER, 1933b: 67.]  
 = *Dolichoderus (Hypoclinea) quadripunctatus* subsp. *yoshiokae* WHEELER, 1933b: 67. [Syn. YASUMATSU, 1941: 182.]  
 = *Dolichoderus (Hypoclinea) abietis* KÔNO & SUGIHARA, 1939: 12. [Syn. YASUMATSU, 1941: 182.]  
 = *Dolichoderus quadripunctatus* subsp. *japonicus* YOSHIOKA, 1939: 70. [Syn. YASUMATSU, 1941: 182.]
- 107. *Iridomyrmex glaber* (MAYR), 1862: 705. [TERANISHI, 1929c: 42.]
- 108. *Iridomyrmex itoi* FOREL, 1900: 269.  
 = *Iridomyrmex itoi* var. *abbotti* WHEELER, 1906: 318. [Syn. YANO, 1910: 420.]
- 109. *Tapinoma indicum* FOREL, 1895a: 472. [TERANISHI, 1929b: 313.]
- 110. *Tapinoma melanocephalum* (FABRICIUS), 1793: 353. [TERANISHI, 1927a: 51.]
- 111. *Technomyrmex albipes* (FR. SMITH), 1861: 38. [TERANISHI, 1929b: 313.]  
 = *Technomyrmex detorquens*, OKAMOTO, 1966: 7. [See BROWN, 1958b: 41.]
- 112. *Technomyrmex gibbosus* WHEELER, 1906: 319.

## Subfamily Formicinae (58 forms)

- 113. *Acropyga (Rhizomyrma) sauteri* FOREL, 1912b: 72. [TERANISHI, 1929a: 250.]
- \*114. *Anoplolepis longipes* (JERDON), 1851: 122. [TERANISHI, 1929c: 42.]
- \*115. *Paratrechina (Paratrechina) longicornis* (LATREILLE), 1802b: 113. [TERANISHI, 1924: 53.]
- 116. *Paratrechina (Nylanderia) bourbonica* (FOREL), 1886: 210.  
 = *Paratrechina bourbonica* race *bengalensis* FOREL, 1894b: 406. [TERANISHI, 1929c: 42] [Syn. WILSON & TAYLOR, 1967: 88.]
- 117. *Paratrechina (Nylanderia) flavipes* (FR. SMITH), 1874: 404.
- 118. *Paratrechina (Nylanderia) minutula sauteri* (FOREL), 1913b: 198. [WHEELER, 1928a: 120.]
- 119. *Paratrechina (Nylanderia) sakurae* (ITO), 1914: 43.
- 120. *Paratrechina (Nylanderia) teranishii* SANTSCHI, 1937: 386.
- 121. *Lasius (Lasius) alienus* FOERSTER, 1850: 36. [ANDRÉ, 1903: 128.]
- 122. *Lasius (Lasius) hayashi* YAMAUCHI & HAYASHIDA, 1970: 510.
- 123. *Lasius (Lasius) niger* (LINNAEUS), 1758: 580. [FR. SMITH, 1874: 403.]  
 = *Lasius niger* var. *alieno-niger* FOREL, 1874: 47. [ITO, 1914: 44.] [Syn. WILSON, 1955: 59.]  
 = *Lasius niger* st. *coloratus* SANTSCHI, 1937: 387. [Syn. WILSON, 1955: 60.]  
 = *Lasius emarginatus* v. *japonicus* SANTSCHI, 1941: 277. [Syn. WILSON, 1955: 60.]
- \*124. *Lasius (Lasius) productus* WILSON, 1955: 95.
- \*125. *Lasius (Lasius) sakagamii* YAMAUCHI & HAYASHIDA, 1970: 504.
- 126. *Lasius (Cautolasius) flavus* (FABRICIUS), 1781: 491. [TERANISHI, 1917: 9.]  
 = *Lasius flavus* r. *myops* FOREL, 1894a: 12. [MORISITA, 1945: 26.] [Syn. WILSON, 1955: 112.]
- 127. *Lasius (Cautolasius) sonobei* YAMAUCHI, 1979: 163.
- \*128. *Lasius (Cautolasius) talpa* WILSON, 1955: 136.  
 = *Lasius flavus myops*, WHEELER, 1906: 322. [Syn. WILSON, 1955: 138.]
- 129. *Lasius (Chthonolasius) hikosanus* YAMAUCHI, 1979: 169.
- 130. *Lasius (Chthonolasius) umbratus* (NYLANDER), 1846b: 1048. [FOREL, 1900: 269.]  
 = *Lasius umbratus* var. *mixto-umbratus* FOREL, 1874: 48. [ITO, 1914: 44.] [Syn. WILSON, 1955: 151.]

- = *Lasius silvestrii* WHEELER, 1928a: 120. [Syn. WILSON, 1955: 152. This synonymy might be erroneous. Also see TERANISHI, 1933b: 85.]
- = *Lasius silvestri*[!] var. *osakana* SANTSCHI, 1941: 278. [Syn. WILSON, 1955: 152.]
- = *Formicina rabaudi* BONDROIT, 1917a: 177. [WILSON, 1955: 170.] [Syn. BOURNE, 1973: 25.] [*Rabaudi* ≠ *umbratus*, YAMAUCHI, 1979: 166. I do not agree to this treatment. The Japanese species referable to YAMAUCHI's *rabaudi* might be *silvestrii* WHEELER.]
- \*131. *Lasius (Dendrolasius) crispus* WILSON, 1955: 144.
132. *Lasius (Dendrolasius) fuliginosus* (LATREILLE), 1798: 36. [Fr. SMITH, 1874: 403.]  
= *Lasius fuliginosus* var. *nipponensis* FOREL, 1912a: 339. [Syn. WILSON, 1955: 138. This synonymy might be erroneous.]
- \*133. *Lasius (Dendrolasius) morisutai* YAMAUCHI, 1979: 176.
- \*134. *Lasius (Dendrolasius) spathepus* WHEELER, 1910: 130.
- \*135. *Lasius (Dendrolasius) teranishii* WHEELER, 1928a: 120.  
= *Lasius umbratus*?, TERANISHI, 1927c: 90. [Syn. WHEELER, 1928a: 120.]  
= *Lasius (Chthonolasius) Ouchii* TERANISHI, 1940: 76. [Syn. MORISITA, 1945: 23.]
- \*136. *Formica (Raptiformica) sanguinea* LATREILLE, 1798: 37. [ANDRÉ, 1903: 128.]  
= *Formica sanguinea* var. *fusciceps* EMERY, 1895: 335. [Syn. DLUSSKY, 1965: 16.]
- \*137. *Formica (Coptoformica) fukaii* WHEELER, 1914: 26.  
= *Formica exsecta*, YANO, 1912: 128. [Syn. SONOBE & DLUSSKY, 1977: 23.]
138. *Formica (Formica) truncorum* FABRICIUS, 1804: 403. [TERANISHI, 1929a: 243.]  
= *Formica truncicola* NYLANDER, 1846a: 907. [ANDRÉ, 1903: 128.] [Syn. BONDROIT, 1918: 60.]
139. *Formica (Formica) truncorum* var. *yessensis* FOREL, 1901b: 66. [*Yessensis* = *lugubris*, DLUSSKY, 1967: 91.] [*Yessensis* ≠ *lugubris*, SONOBE, 1977b: 2.]
- \*140. *Formica (Serviformica) gagatoides* RUZSKY, 1904: 289. [SONOBE & DLUSSKY, 1977: 23.]
- \*141. *Formica (Serviformica) japonica* MOTSCHULSKY, 1866: 183.  
= *Formica fusca* v. *nipponensis* FOREL, 1900: 270. [Syn. EMERY, 1909: 197.]
142. *Formica (Serviformica) lemani* BONDROIT, 1917b: 186. [KONDOH, 1968: 126.]
143. *Formica (Serviformica) transcaucasica* NASONOV, 1889: 21. [KONDOH, 1968: 132.]  
= *Formica picea* NYLANDER, 1846a: 917. [TERANISHI, 1929a: 244.] [Preoccupied, nec *picea* LEACH, 1825, see YARROW, 1954: 232.]
144. *Formica (Serviformica) transcaucasica* var. *yatsuensis* TERANISHI, 1940: 80.
145. *Formica (Serviformica) yoshioka* WHEELER, 1933b: 66.
- \*146. *Polyergus samurai* YANO, 1911: 110.
147. *Camponotus (Camponotus) hemichlaena* YASUMATSU & BROWN, 1951: 40.
148. *Camponotus (Camponotus) herculeanus* var. *sachalinensis* FOREL, 1904: 381. [TERANISHI, 1932: 50.]
149. *Camponotus (Camponotus) japonicus* MAYR, 1866b: 885.  
= *Camponotus pennsylvanicus* var. *atterima* EMERY, 1894: 478. [TERANISHI, 1929a: 240.] [Syn. YASUMATSU & BROWN, 1951: 36.]  
= *Camponotus herculeanus saxatilis* RUZSKY, 1895: 7. [TERANISHI, 1932: 51.] [Syn. YASUMATSU & BROWN, 1951: 37.]
150. *Camponotus (Camponotus) obscuripes* MAYR, 1878: 645.  
= *Camponotus ligniperdus*, Fr. SMITH, 1874: 402. [Syn. YASUMATSU & BROWN, 1951: 38.]
- \*151. *Camponotus (Camponotus) yessensis* TERANISHI, 1940: 72.
152. *Camponotus (Tanaemyrmex) devastivus* WHEELER, 1928a: 117.
153. *Camponotus (Tanaemyrmex) habereri* FOREL, 1911: 293.
154. *Camponotus (Tanaemyrmex) siemsseni* FOREL, 1901b: 70. [YASUMATSU, 1940: 69.]
155. *Camponotus (Tanaemyrmex) variegatus* var. *dulcis* EMERY, 1889b: 511. [YASUMATSU, 1940: 69.]



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- \*156. *Camponotus (Paramyrmamblys) kiusiuensis* SANTSCHI, 1937: 279.
- 157. *Camponotus (Myrmentoma) caryae brunni* FOREL, 1901b: 70.
- 158. *Camponotus (Myrmentoma) caryae* var. *keihitoi* FOREL, 1913a: 663.
- 159. *Camponotus (Myrmentoma) caryae* var. *nawai* ITO, 1914: 44.
- \*160. *Camponotus (Myrmentoma) caryae* var. *quadrinotatus* FOREL, 1886: 142.
- 161. *Camponotus (Myrmentoma) caryae* var. *teranishii* WHEELER, 1928a: 118.  
- *Camponotus tokyoensis* TERANISHI, 1915: 137. [Preoccupied, nec *tokioensis* ITO, 1912.]
- 162. *Camponotus (Myrmentoma) marginatus vitiosus* FR. SMITH, 1874: 403.
- 163. *Camponotus (Myrmamblys) itoi* FOREL, 1912a: 340.
- 164. *Camponotus (Myrmamblys) nigronitidus* AZUMA, 1951: 89.
- \*165. *Camponotus (Myrmamblys) nipponensis* SANTSCHI, 1937: 381.
- 166. *Camponotus (Myrmamblys) tokioensis* ITO, 1912: 341.
- 167. *Camponotus (Myrmamblys) tokioensis* var. *atrigenatus* SANTSCHI, 1937: 384.
- 168. *Camponotus (Myrmamblys) tokioensis* var. *inconstans* SANTSCHI, 1937: 385.
- \*169. *Camponotus (Colobopsis) nipponicus* WHEELER, 1928a: 118.  
- *Camponotus (Colobopsis) rathneyi*, WHEELER, 1906: 327. [Syn. WHEELER, 1928a: 119.]  
- *Camponotus (Colobopsis) truncatus*, ITO, 1914: 45. [Syn. WHEELER, 1928a: 119.]
- \*170. *Polyrhachis (Myrma) latona* WHEELER, 1909b: 337. [ONOYAMA, 1976: 126.]
- \*171. *Polyrhachis (Myrmhopla) dives* FR. SMITH, 1857: 64. [SONAN, 1912: 438.]
- \*172. *Polyrhachis (Myrmhopla) hippomanes* var. *moesta* EMERY, 1887: 237. [TERANISHI, 1933a: 80.]
- \*173. *Polyrhachis (Polyrhachis) lamellidens* FR. SMITH, 1874: 403.

The following 11 forms are excluded from the above list because of doubtful identifications.

## A2. Doubtful identifications (11 forms)

1. *Ponera coarctata* (LATREILLE), 1802a: 65. [YANO, 1910: 419.] [About distribution, see TAYLOR, 1967: 26.]
2. *Hypoponera gleadowii* (FOREL), 1895b: 292. [AZUMA, 1952: 2.]
3. *Cerapachys typhlus* (ROGER), 1861: 20. [SONOBE, 1973: 15.] [See ONOYAMA, 1976: 128.]
4. *Myrmica lobicornis* NYLANDER, 1846a: 933. [SONOBE, 1971: 202.] [By my recent unpublished study.]
5. *Myrmica ruginodis* NYLANDER, 1846a: 929. [HAYASHIDA, 1957: 173.] [By my recent unpublished study.]
6. *Myrmica scabrinodis* NYLANDER, 1846a: 931. [MORISITA, 1940: 54.] [By my recent unpublished study.]
7. *Aphaenogaster smythiesi* FOREL, 1902: 222. [KOGURE, 1959: 34.]
8. *Crematogaster (Crematogaster) brunnea ruginota* FOREL, 1902: 207. [AZUMA, 1938: 240.]
9. *Formica (Formica) rufa* LINNAEUS, 1758: 580. [OHTA, 1936: 167.]
10. *Formica (Serviformica) fusca* LINNAEUS, 1758: 580. [KONDOH, 1968: 126.]  
= *Formica glebaria* NYLANDER, 1846a: 917. [TERANISHI, 1929a: 244.] [Syn. YARROW, 1954: 230.]
11. *Camponotus (Myrmentoma) marginatus* LATREILLE, 1798: 35. [ANDRÉ, 1903: 128.] [Based on the male only.]

## A3. Identifications originally with question marks (4 forms)

1. *Pheidole fervens* (?) FR. SMITH, 1858: 176. [ABE *et al.*, 1976: 115.]
2. *Pheidole oceanica* (?) MAYR, 1866a: 510. [ABE *et al.*, 1976: 115.]
3. *Monomorium destructor* (?) (JERDON), 1851: 105. [ONOYAMA, 1976: 125.]
4. *Cardiocondyla nuda mauritanica* ? FOREL, 1890a: 75. [TERANISHI, 1929b: 316.]  
= *Cardiocondyla wroughtoni*, TERANISHI, 1940: 46. [See TERANISHI, 1940: 48.]

Table 1. Number of living species recorded or here recognized in each genus of ants of Japan.

Generic name	No. of forms recorded	No. of species recognized
Subfam. <b>Ponerinae</b>	[19]	[31]
1. <i>Amblyopone</i>	1	5
2. <i>Probolomyrmex</i>	0	1
3. <i>Proceratium</i>	3	4
4. <i>Discothyrea</i>	0	1
5. <i>Diacamma</i>	1	1
6. <i>Odontoponera</i>	1*	0*
7. <i>Ectomomyrmex</i>	2	1
8. <i>Brachyponera</i>	1	1
9. <i>Trachymesopus</i>	1	2
10. <i>Cryptopone</i>	1	2
11. <i>Ponera</i>	5	6
12. <i>Hypoponera</i>	1	5
13. <i>Leptogenys</i>	1	1
14. <i>Odontomachus</i>	1	1
Subfam. <b>Cerapachyinae</b>	[1]	[2]
15. <i>Cerapachys</i>	1	2
Subfam. <b>Myrmicinae</b>	[78]	[106]
16. <i>Myrmica</i>	7	6
17. <i>Manica</i>	1	1
18. <i>Stenamma</i>	2	2
19. <i>Aphaenogaster</i>	7	7
20. <i>Messor</i>	1	1
21. <i>Pheidole</i>	5	9
22. <i>Leptothorax</i>	4	12
<i>Leptothorax</i> s. str.	(1)	(1)
<i>Myrafant</i>	(2)	(10)
<i>Nesomyrmex</i>	(1)	(1)
23. <i>Triglyphothrix</i>	1	1
24. <i>Tetramorium</i>	12	10
25. <i>Strongylognathus</i>	0	1
26. <i>Monomorium</i>	11	9
27. <i>Diplorhoptrum</i>	2	2
28. <i>Oligomyrmex</i>	1	3
29. <i>Trigonogaster</i>	0	1
30. <i>Vollenhovia</i>	2	3
31. <i>Lordomyrma</i>	1	1
32. <i>Myrmecina</i>	1	5
33. <i>Pristomyrmex</i>	1	2
34. <i>Cardiocondyla</i>	3	3
35. <i>Crematogaster</i>	8	5
<i>Crematogaster</i> s. str.	(7)	(4)
<i>Orthocrema</i>	(1)	(1)
36. <i>Strumigenys</i>	2	7
37. <i>Quadristruma</i>	1	1
38. <i>Smithistruma</i>	2	3
39. <i>Pentastroma</i>	1	1
40. <i>Weberistruma</i>	1	4
41. <i>Trichoscapa</i>	1	1
42. <i>Codomyrmex</i>	0	1

(Table 1. Continued)

	Generic name	No. of forms recorded	No. of species recognized
43.	Un-named new genus A	0	1
44.	<i>Kyidris</i>	1	1
45.	<i>Epitritus</i>	1	2
	Subfam. <b>Dorylinae</b>	[0]	[1]
46.	<i>Aenictus</i>	0	1
	Un-named new subfamily	[0]	[3]
47.	Un-named new genus B	0	2
48.	Un-named new genus C	0	1
	Subfam. <b>Leptanillinae</b>	[5]	[6]
49.	<i>Leptanilla</i>	5	6
	Subfam. <b>Dolichoderinae</b>	[7]	[6]
50.	<i>Dolichoderus</i>	1	1
51.	<i>Iridomyrmex</i>	2	1
52.	<i>Tapinoma</i>	2	2
53.	<i>Technomyrmex</i>	2	2
	Subfam. <b>Formicinae</b>	[61]	[64]
54.	<i>Acropyga</i>	1	3
	<i>Rhizomyrma</i>	(1)	(2)
	<i>Atopodon</i>	(0)	(1)
55.	<i>Plagiolepis</i>	0	1
56.	<i>Anoplolepis</i>	1	1
57.	<i>Prenolepis</i>	0	1
58.	<i>Paratrechina</i>	6	9
	<i>Paratrechina</i> s. str.	(1)	(2)
	<i>Nylanderia</i>	(5)	(7)
59.	<i>Lasius</i>	15	15
	<i>Lasius</i> s. str.	(5)	(4)
	<i>Cautolasius</i>	(3)	(3)
	<i>Chthonolasius</i>	(2)	(3)
	<i>Dendrolasius</i>	(5)	(5)
60.	<i>Formica</i>	10	9
	<i>Raptiformica</i>	(1)	(1)
	<i>Coptoformica</i>	(1)	(1)
	<i>Formica</i> s. str.	(2)	(2)
	<i>Serviformica</i>	(6)	(5)
61.	<i>Polyergus</i>	1	1
62.	<i>Camponotus</i>	23	20
	<i>Camponotus</i> s. str.	(5)	(5)
	<i>Tanaemyrmex</i>	(4)	(6)
	<i>Paramyrmamblys</i>	(1)	(1)
	<i>Myrmentoma</i>	(6)	(2)
	<i>Myrmamblys</i>	(6)	(4)
	<i>Colobopsis</i>	(1)	(2)
63.	<i>Polyrhachis</i>	4	4
	<i>Myrma</i>	(1)	(1)
	<i>Myrmhopla</i>	(2)	(2)
	<i>Polyrhachis</i> s. str.	(1)	(1)
Total ( <b>Formicidae</b> )		173	219

\* Introduced?: exact locality is unknown.

- B. Living species recorded only at botanical gardens (BG) or quarantine stations (QS) (5 forms)
1. *Leptogenys punctiventris* (MAYR), 1878: 666. [BG; AZUMA, 1951: 86.]
  2. *Aphaenogaster (Attomyrma) fulva* ROGER, 1863: 190. [QS; OHTA, 1938: 312.]
  3. *Pheidole nodus azumai* SANTSCHI, 1941: 274. [BG.]
  4. *Tetramorium indicum* FOREL, 1913c: 81. [BG; SANTSCHI, 1941: 276.]
  5. *Crematogaster (Orthocrema) quadriformis* ROGER, 1863: 207. [QS; OHTA, 1938: 343.]
- C. Fossil species (1 form)
1. *Aphaenogaster (Deromyrma) avita* FUJIYAMA, 1970: 67. [Middle Miocene.]

### III. Number of Living Species in Each Genus

ONOYAMA (1976) gave a list of ant genera of Japan and recognized about 200 species as occurring in Japan. Here I consider that at least 219 species are living in Japan. The number of species I have recognized in each genus is shown in Table 1 together with the number of forms listed above (list A). The difference between the two totals is 46. I think that about 10 forms in the check list are synonymous to other forms, and that a few forms may be excluded from the Japanese fauna. Thus, about 60 species remain unidentified.

With the development of our knowledge about the classification of Japanese ants especially of the genera *Aphaenogaster*, *Pheidole*, *Leptothorax*, *Crematogaster*, *Paratrechina*, *Lasius*, and *Camponotus*, we must recognize more species than here counted. Also, if we collect more ants from various localities, we must discover more species even from genera not known in Japan especially in ponerine and myrmicine ants. I will try to estimate elsewhere the final number of ant species living in Japan on the basis of several theoretical considerations.

Lists of ant species found in some areas such as within a prefecture or an island will be published. In this case, for example, a statement of *Leptothorax* sp. without morphological description does scarcely mean anything because the subgenus *Myrafant* of *Leptothorax* has at least 10 species in Japan as is shown in Table 1. Also listing the name of *Leptothorax congruus* or *L. spinosior* has little information at least to me until revisionary works are published. Determination only on the basis of old literature is dangerous. For example, what AZUMA (1977: 321) called *Crematogaster laboriosa* is certainly not *laboriosa* Fr. SMITH judging from its distribution (see ONOYAMA, 1976: 131).

We do not know identities of a number of species. Needless to say, this is an unfortunate matter. The number of species in each genus shown in Table 1 might offer some information for future revisers of ants of Japan.

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### References

- ABE, T., & A. MAEDA, 1977. Fauna and density of ants in sugarcane fields of the southern part of Okinawa Island. In IKEHARA, S., (ed.), Ecological studies of nature conservation of the Ryukyu Islands, University of the Ryukyus, (III): 75-92.
- , M. NAKAMORI, & K. UEZU, 1976. Fauna and density of a coastal limestone area in Okinawa Island. *Ibid.*, (II): 113-120.
- ANDRÉ, E., 1903. Hyménoptères Formicides, récoltés au Japon par M. J. HARMAND. *Bull. Mus. d'Hist. Nat. Paris*, (1903): 128.
- AZUMA, M., 1938. A list of ants found in Osaka Prefecture, Japan. *Kontyûkai*, 6: 238-243. (In Japanese.)
- 1950. On the myrmecological-fauna of Tomogashima, Kii Prov. with the description of new genus and new species. *Hyogo Biology*, 1: 34-37. (In Japanese.)
- 1951. On the myrmecological-fauna of Osaka Prefecture, Japan with description of new species (Formicidae, Hymenoptera). *Ibid.*, 1: 86-90. (In Japanese.)
- 1952. Notes on the participation in scientific research of Kitayama-kyô, Kii Prov. *Kôyô*, (4): 1-7. (In Japanese.)
- 1953. On the myrmecological-fauna of Mt. Rokko, Hyogo-Pre. (Formicidae, Hymenoptera). *Warera*, (2): 1-7. (In Japanese.)
- 1955. A list of ants (Formicidae) from Hokkaido Is. *Hyogo Biology*, 3: 79-80. (In Japanese.)
- 1977. Formicidae. In ITO, S., T. OKUTANI, & I. HIURA, (ed.), Coloured illustrations of the insects of Japan Vol. II: 319-324. Hoikusha Co. Ltd., Osaka. (In Japanese.)
- BARONI URBANI, C., 1968. Über die eigenartige Morphologie der männlichen Genitalien des Genus *Diplorhoptrum* MAYR (Hymenoptera Formicidae) und die taxonomischen Schlussfolgerungen. *Z. Morph. Tiere*, 63: 63-74.
- 1977. Materiali per una revisione della sottofamiglia Leptanillinae EMERY (Hymenoptera: Formicidae). *Ent. Basiliensia*, 2: 427-488.
- BOLTON, B., 1976. The ant tribe Tetramoriini (Hymenoptera: Formicidae). Constituent genera, review of smaller genera and revision of *Triglyphothrix* FOREL. *Bull. Brit. Mus. Nat. Hist. Ent.*, 34: 281-379.
- 1977. The ant tribe Tetramoriini (Hymenoptera: Formicidae). The genus *Tetramorium* MAYR in the Oriental and Indo-Australian regions, and in Australia. *Ibid.*, 36: 67-151.
- \*BONDROIT, J., 1917 a. Notes sur quelques Formicidae de France. *Bull. Soc. Ent. Fr.*, 86: 174-177.
- \*——— 1917 b. Diagnoses de trois nouveaux *Formica* d'Europe. *Ibid.*, 86: 186-188.
- \*——— 1918. Les fourmis de France et de Belgique. *Ann. Soc. Ent. Fr.*, 87: 1-174.
- BOURNE, R. A., 1973. A taxonomic study of the ant genus *Lasius* FABRICIUS in the British Isles (Hymenoptera: Formicidae). *J. Ent. (B)*, 42: 17-27.
- BRIAN, M. V., & A. D. BRIAN, 1949. Observations on the taxonomy of the ants *Myrmica rubra* L. and *M. laevinodis* NYLANDER. (Hymenoptera: Formicidae). *Trans. R. Ent. Soc. Lond.*, 100: 393-409.
- BROWN, W. L., JR., 1949 a. Revision of the ant tribe Dacetini. I. Fauna of Japan, China and Taiwan. *Mushi, Fukuoka*, 20: 1-25.
- 1949 b. Notes on Chinese ants: I. *Crematogaster* LUND. *Ibid.*, 20: 37-38.

- BROWN, W. L., JR., 1952. Synonymous ant names. *Psyche*, **58**: 124.
- 1958 a. A new Japanese species of the dacetine ant genus *Epitritus*. *Mushi, Fukuoka*, **31**: 69-72.
- 1958 b. A review of the ants of New Zealand (Hymenoptera). *Acta Hymenopterol*, **1**: 1-50.
- 1963. Characters and synonymies among the genera of ants. Part III. Some members of the tribe Ponerini (Ponerinae, Formicidae). *Breviora*, (190): 1-10.
- 1975. Contributions toward a reclassification of the Formicidae. V. Ponerinae, tribes Platythyreini, Cerapachyini, Cylindromyrmecini, Acanthostichini, and Aenictogitini. *Search (Ithaca)*, **5**: 1-115.
- 1976. Contributions toward a reclassification of the Formicidae. Part VI. Ponerinae, tribe Ponerini, subtribe Odontomachitini. Section A. Introduction, subtribal characters, genus *Odontomachus*. *Studia Ent.*, **19**: 67-171.
- & R. G. BOISVERT, 1979. The dacetine ant genus *Pentastruma* (Hymenoptera: Formicidae). *Psyche*, **85**: 201-207.
- & K. YASUMATSU, 1951. On the publication date of *Polyhomoa itoi* AZUMA (Hymenoptera, Formicidae). *Mushi, Fukuoka*, **22**: 93-95.
- CAMERON, P., 1887. On a new species of *Strumigenys* (S. *Lewisi*) from Japan. *Proc. Manchester Lit. Phil. Soc.*, **25**: 229-232.
- CHAPMAN, J. W., & S. R. CAPCO, 1951. Check list of the ants (Hymenoptera: Formicidae) of Asia. *Mon. Inst. Sci. Tech. (Manila)*, **1**: 1-327.
- DALLA TORRE, K. W. von, 1893. *Catalogus Hymenopterorum*. Vol. VII: Formicidae (Heterogyna). 289 pp. W. Engelmann, Leipzig.
- DLUSSKY, G. M., 1965. Ants of the genus *Formica* L. of Mongolia and Northeast Tibet (Hymenoptera, Formicidae). *Ann. Zool. (Warszawa)*, **23**: 15-43.
- 1967. Ants of the genus *Formica*. 236 pp. Nauka, Moscow. (In Russian.)
- \*EMERY, C., 1869. Enumerazione dei Formicidi che rinvenngonsi nei contorni di Napoli, con descrizioni di specie nuove o meno conosciute. *Ann. Acc. Aspir. Nat. Napoli*, (2)2: 1-26.
- \*——— 1887. Catalogo delle formiche esistenti nelle collezioni del Museo Civico di Genova. Parte terza: Formiche delle resione Indo-Malese e dell'Australia. *Ann. Mus. Civ. Stor. Nat. Genova*, (2)4: 209-258.
- \*——— 1889 a. Intorno ad alcune formiche della fauna palaearctica. *Ibid.*, (2)7: 439-443.
- \*——— 1889 b. Viaggio di Leonardo FEA in Birmania e regioni vicini. XX. Formiche di Birmania e del Tenasserim raccolte da Leonard FEA (1885-87). *Ibid.*, (2)7: 485-520.
- \*——— 1890. Studi sulle formiche della fauna neotropica. 1-V. *Bull. Soc. Ent. Ital.*, **22**: 38-80.
- \*——— 1892. Voyage de M. Ch. ALLUAD dans le territoire d'Assinie (Afrique occidentale) en juillet et août 1886. Formicides. *Ann. Soc. Ent. Fr.*, **60**: 553-574.
- \*——— 1894. Viaggio di Leonard FEA in Birmania e regioni vicini. Formiche di Birmania, del Tenasserim e dei Monti Carin raccolte da L. FEA, part 2. *Ann. Mus. Civ. Stor. Nat. Genova*, (2)14: 450-483.
- 1895. Beiträge zur Kenntniss der nortamerikanischen Ameisenfauna (Schluss). *Zool. Jahrb. Syst.*, **8**: 257-360.
- 1897. Revisione del genre *Diacamma* MAYR. *Rend. Accad. Sci. Bologna*, (1896-97): 147-168.
- 1902. Note mirmecologiche. *Rend. R. Acad. Sci. Ist. Bologna*, (n.s.), **6**: 22-34.
- 1908. Beiträge zur Monographie der Formiciden des paläarktischen Faunengebietes. (Hym.). Teil V. *Monomorium*. *Dtsch. Ent. Z.*, (1908): 663-686.
- 1909. Beiträge zur Monographie der Formiciden des paläarktischen Faunengebietes. (Hym.). Teil VII. *Formica*. *Ibid.*, (1909): 179-204.
- \*——— 1925. Notes critique de Myrmécologie. *Ann. Soc. Ent. Belg.*, **64**: 177-191.

- ETTERSCHANK, G., 1966. A generic revision of the world Myrmicinae related to *Solenopsis* and *Pheidologeton* (Hymenoptera: Formicidae). *Aust. J. Zool.*, **14**: 73-171.
- \*FABRICIUS, J. C., 1781. Species insectorum. Vol. 1. 552 pp. Carol. Ernest Bohnii, Hamburgi et Kilonii.
- \*——— 1793. Entomologia systematica emendata et aucta. Vol. 2. 519 pp. Hafniae.
- \*——— 1804. Systema piezatorum. 440 pp. Brunsvigae.
- \*FOERSTER, A., 1850. Hymenopterologische Studien. I Formicidae. 74 pp. Ernst Ter Meer Verl., Aachen.
- FOREL, A., 1874. Les fourmis de la Suisse. *Nouv. Mém. Soc. Helv. Sc. Nat.*, **26**: 1-452.
- \*——— 1881. Die Ameisen der Antille St. Thomas. *Mitt. München Ent. Ver.*, **5**: 1-16.
- 1886. Études myrmécologiques en 1886. *Ann. Soc. Ent. Belg.*, **30**: 131-215.
- \*——— 1890 a. Fourmis de Tunisie et d'Algérie orientales récoltées et décrites. *Ibid.*, **34**: 61-76.
- 1890 b. *Aenictus-Typhlatta* découverte de M. WROUGHTON. Nouveaux genres de formicides. *Ibid.*, **34**: 102-113.
- \*——— 1894 a. Les formicides de la province d'Oran (Algérie). *Bull. Soc. Vaud. Sci. Nat.*, **30**: 1-45.
- \*——— 1894 b. Les Formicides de l'empire des Indes et de Ceylan. Part IV. *J. Bombay Nat. Hist. Soc.*, **8**: 396-420.
- \*——— 1895 a. Les Formicides de l'empire des Indes et de Ceylan. Part V. *Ibid.*, **9**: 453-472.
- \*——— 1895 b. In EMERY, C., Sopra alcune formiche della fauna mediterranea. *Mem. R. Acc. Sci. Ist. Bologna*, (5), **5**: 291-307.
- 1900. Fourmis du Japon. Nids en toile. *Strongylognathus Huberi* et voisins. Fourmilière triple. *Cyphomyrmex Wheeleri*. Fourmi importées. *Mitt. Schweiz. Ent. Ges.*, **10**: 267-287.
- 1901 a. Variétés myrmécologiques. *Ann. Soc. Ent. Belg.*, **45**: 334-382.
- 1901 b. Formiciden des Naturhistorischen Museums zu Hamburg. Neue *Calyptomyrmex*-, *Dacryon*-, *Podomyrma*- und *Echinopla*-Arten. *Mitt. Nat. Mus. Hamburg*, **18**: 43-82.
- 1902. Myrmicinae nouveaux de l'Inde et de Ceylan. *Rev. Suisse Zool.*, **10**: 165-249.
- 1904. Note sur les fourmis du Musée zoologique de l'Académie impériale des Sciences à St. Pétersbourg. *Ann. Mus. Zool. Acad. Sci. Petersburg*, **8**: 368-388.
- 1905. Ameisen aus Java. Gesammelt von Prof. Karl KRAEPELIN 1904. *Mitt. Nat. Mus. Hamburg*, **22**: 1-26.
- 1907 a. Formicides du Musée National Hongrois. *Ann. Mus. Nat. Hungar.*, **5**: 1-42.
- 1907 b. Formiciden aus dem Naturhistorischen Museum in Hamburg. II. Teil. *Mitt. Nat. Mus. Hamburg*, **24**: 1-20.
- 1911. Die Ameisen des K. Zoologischen Museums in München. *Sitzb. Ak. Wiss. München*, **41**: 249-303.
- 1912 a. Quelques fourmis de Tokio. *Ann. Soc. Ent. Belg.*, **56**: 339-342.
- 1912 b. H. SAUTER's Formosa-Ausbeute. Formicidae (Hym.). *Ent. Mitt.*, **1**: 45-61, 67-81.
- 1913 a. Quelques fourmis des Indes, du Japon et d'Afrique. *Rev. Suisse Zool.*, **21**: 659-673.
- 1913 b. H. SAUTER's Formosa-Ausbeute: Formicidae II. *Arch. Naturg. (A)*, **79**: 183-202.
- 1913 c. Ameisen aus Sumatra, Java, Malacca und Ceylon. *Zool. Jahrb. Syst.*, **36**: 1-148.
- 1917. Etudes myrmécologiques en 1917. *Bull. Soc. Vaud. Sci. Nat.*, **51**: 717-727.
- FUJIYAMA, I., 1970. Fossil insects from Chôjaboru Formation, Iki Island, Japan. *Mem. Nat. Sci. Mus. Tokyo*, (3): 65-74.
- HAYASHIDA, K., 1957. Ecological distribution of ants in Sapporo and vicinity (Preliminary report).

- Jour. Fac. Sci. Hokkaido Univ. Ser. VI, Zool.*, **13**: 173-177.
- HAYASHIDA, K., 1971. Vertical distribution of ants in the southern part of the Hidaka Mountains. *Mem. Nat. Sci. Mus. Tokyo*, (4): 29-38. (In Japanese with English summary.)
- IMAI, H. T., & M. KUBOTA, 1972. Karyological studies of Japanese ants (Hymenoptera, Formicidae) III. Karyotypes of nine species in Ponerinae, Formicinae, and Myrmicinae. *Chromosoma (Berl.)*, **37**: 193-200.
- IMAI, H., & T. H. YOSIDA, 1964. Chromosome observation in Japanese ants. *Ann. Rep. Nat. Inst. Gen. Japan*, (15): 64-65.
- IMANISHI, K., 1930. An example of vertical distribution, seen in ants. *Kontyû, Tokyo*, **4**: 185-187. (In Japanese.)
- ITO, T., 1912. *Campanotus Itoi (Myrmamblys) FOREL stirps tokioensis ITO nov. st.* In FOREL, A., Quelques fourmis de Tokio. *Ann. Soc. Ent. Belg.*, **56**: 341-342.
- 1914. Formicidarum japonicarum species novae vel minus cognitae. *Ibid.*, **58**: 40-45.
- \*JERDON, T. C., 1851. A catalogue of the species of ants found in southern India. *Madras Jour. Litt. Sci.*, **17**: 103-127.
- KOGURE, T., 1959. Ants found in the vicinity of Lake Shikotsu, Hokkaidô. *Saishû to Shiiku*, **21**: 34-35. (In Japanese.)
- KONDOH, M., 1968. Bioeconomic studies on the colony of an ant species, *Formica japonica* MOTSCHULSKY 1. Nest structure and seasonal change of the colony members. *Jap. J. Ecol.*, **18**: 124-133.
- KÔNO, H., & Y. SUGIHARA, 1939. Die Formiciden im Tannen- und Fichtenwald in Japan. *Trans. Kansai Ent. Soc.*, (8): 8-14. (In Japanese.)
- KUBOTA, M., 1971. A check list of the Formicidae of Japan. 34 pp. Published by the author, Odawara. (Mimeographed.)
- 1976. Dacetine ants from Ogasawara Islands. *Ari*, (7): 4. (In Japanese.)
- KUGLER, C., 1978. A comparative study of the myrmicine sting apparatus (Hymenoptera, Formicidae). *Studia Ent.*, **20**: 413-548.
- \*LATREILLE, P. A., 1798. Essai sur l'histoire des fourmis de la France. 50 pp. F. Bourdeaux, Brive.
- \*——— 1802 a. Description d'une nouvelle espèce de fourmi. *Bull. Soc. Philomath. Paris*, **3**: 65-66.
- \*——— 1802 b. Histoire naturelle des fourmis. 445 pp. Crapelet, Paris.
- LINNAEUS, C., 1758. Formica. Systema Naturae. Editio decima. Tomus I. pp. 579-582.
- MATSUMURA, S., 1912. *Myrtoterus kuraiwae* n. sp. In Thousand insects of Japan. Supplement IV. pp. 191-192. Keiseisha, Tokyo.
- & T. UCHIDA, 1926. Die Hymenopteren-Fauna von den Riukiu-Inseln. *Ins. Matsu-murana*, **1**: 32-52.
- \*MAYR, C., 1855. Formicina austriaca. Beschreibung der bisher im österreichischen Kaiserstaate aufgefundenen Ameisen, nebst Hinzufügung jener in Deutschland, in der Schweiz und in Italien vorkommenden Arten. *Verh. Zool.-bot. Ver. Wien*, **5**: 273-478.
- \*——— 1862. Myrmecologische Studien. *Verh. Zool.-bot. Ges. Wien*, **12**: 649-776.
- \*——— 1866 a. Myrmecologische Beiträge. *Sitzb. Akad. Wiss. Wien*, **53**: 484-517.
- \*——— 1866 b. Diganosen neuer und wenig gekannter Formiciden. *Verh. Zool.-bot. Ges. Wien*, **16**: 885-908.
- \*——— 1867. Adonotations in monographiam Formicidarum indo-neerlandicarum. *Tijdschr. v. Ent.*, **10**: 33-117.
- \*——— 1870. Neue Formiciden. *Verh. Zool.-bot. Ges. Wien*, **20**: 939-996.
- \*——— 1872. [I could not know the title and number of pages. The description of *Monomarium latinode* is on page 152 of *Ann. Mus. Civ. Stor. Nat. Genova*, **2**.]
- 1878. Beiträge zur Ameisen-Fauna Asiens. *Verh. Zool.-bot. Ges. Wien*, **28**: 645-686.



- MIYAMOTO, S., T. NAKANE, & S. UENO, 1954. Collecting insects at Tokara Islands (2). *Shinkonhû*, 7(2): 28-34. (In Japanese.)
- MORISITA, M., 1940. Red ants of the genus *Formica* at Mt. Norikura. *Yamagoya*, (106): 53-59. (In Japanese.)
- 1945. Ants of the southernmost part of Hokkaido. *Mushi, Fukuoka*, 16: 21-28. (In Japanese.)
- & K. ONOYAMA, 1974. The ants of Kyoto Prefecture. In MORISITA, M., (ed.), The fauna of Kyoto Prefecture, Japan: 31-40. Kyoto Prefectural Government. (In Japanese.)
- \*MOTSCHULSKY, V. de, 1866. Catalogue des insectes reçus du Japon. *Bull. Soc. Nat. Moscou*, 39: 162-200.
- \*NASONOV, N. V., 1889. Contribution to the natural history of the ants of Russia. *Trav. Lab. Zool. Univ. Moscow*, 4: 1-42. (In Russian)
- \*NYLANDER, W., 1846 a. Adonotations in monographiam Formicarum borealium Europae. *Acta Soc. Sci. Fenn.*, 2: 875-944.
- \*——— 1846 b. Additamentum adonotationum in monographiam Formicarum borealium Europae. *Ibid.*, 2: 1041-1062.
- OHTA, Y., 1936. A list of Japanese ants (continued). *The Insect World*, 40: 166-169. (In Japanese.)
- 1938. Three species of Brazilian ants found in quarantined plants. *Ibid.*, 42: 284-286. 312-313, 343-344. (In Japanese.)
- OKAMOTO, H., 1957. Ants from Shikoku, Japan (4). *Gensei*, 5: 39-43. (In Japanese.)
- 1966. Ditto. (5). *Ibid.*, (16): 5-8. (In Japanese.)
- 1972. The occurrence of *Triglyphothrix striatidens* (EMERY) in Kyushu. *Ibid.*, (23): 14. (In Japanese.)
- ONOYAMA, K., 1976. A preliminary study on the ant fauna of Okinawa-Ken, with taxonomic notes (Japan; Hymenoptera: Formicidae). In IKEHARA, S., (ed.), Ecological studies of nature conservation of the Ryukyu Islands, University of the Ryukyus, (II): 121-141.
- ROGER, J., 1861. Die *Ponera*-artigen Ameisen (Schluss). *Berlin. ent. Z.*, 5: 1-54.
- 1863. Die neu aufgeführten Gattungen und Arten meines Formiciden-Verzeichnisses nebst Ergänzung einiger früher gegebenen Beschreibungen. *Ibid.*, 7: 131-214.
- RÖSZLER, P., 1936. Beiträge zur Kenntnis der Ameisenfauna von Spanien und anderer mitteleuropäischer Länder. II. Teil der Arbeit: „Ein Versuch zur systematischen Einteilung der mitteleuropäischen *Tetramorium*“. *Verhabdl. Mitt. Sieb. Ver. Naturwiss. Herm.*, (1935-36): 1-14.
- \*RUZSKY, M. D., 1895. Faunistische Untersuchungen in östlichen Russland. *Kazan Soc. Nat. Trans.*, 28: 1-64. (In Russian.)
- \*——— 1904. [I could not know the title and number of pages. The description of *Formica gagatoides* is on page 289 of *Nachr. Russ. Geogr. Gesell. Petersburg*, 41.]
- SANTSCHI, F., 1925. Contribution à la faune myrmécologique de la Chine. *Bull. Soc. Vaud. Sci. Nat.*, 56: 81-96.
- 1930. Trois notes myrmécologiques. *Bull. Ann. Soc. Ent. Belg.*, 70: 263-270.
- 1937. Fourmis du Japon et de Formose. *Ibid.*, 77: 361-388.
- 1941. Quelques fourmis japonaises inédites. *Mitt. Schweiz. Ent. Ges.*, 18: 273-279.
- SHINDO, M., 1979. Ants of the Ogasawara Islands. *Kontyû to Shizen*, 14(10): 24-28. (In Japanese.)
- \*SMITH, F., 1851. List of the specimens of British animals in the collections of the British Museum. Part IV. Hymenoptera Aculeata. 134 pp. London.
- \*——— 1857. Catalogue of the hymenopterous insects collected at Sarawak, Borneo; Mount Ophir, Malacca; and at Singapore by A. R. WALLACE. *J. Proc. Linn. Soc. London*, 2: 42-130.
- \*——— 1858. Catalogue of hymenopterous insects in the collection of the British Museum. Part VI. Formicidae. 216 pp. Taylor & Francis, London.
- \*——— 1861. Catalogue of hymenopterous insects collected by Mr. A. R. WALLACE in the

- islands of Ceram, Celebes, Ternate and Gilolo. *J. Linn. Soc. Zool.*, **6**: 36-66.
- SMITH, F., 1874. Description of new species of Tenthredinidae, Ichneumonidae, Chrysididae, Formicidae, &c. of Japan. *Trans. Ent. Soc. Lond.*, (1874): 373-409.
- SMITH, M. R., 1950. On the status of *Leptothorax* MAYR and some of its subgenera. *Psyche*, **57**: 29-30.
- SONAN, J., 1912. Studies on *Polyrhachus aives* F. SMITH. *The Insect World*, **16**: 436-440. (In Japanese.)
- SONOBE, R., 1971. Ant survey of the Mt. Daisetsu Area. In KATO, M., (ed.), Annual report of JIBP/CT-S for the fiscal year of 1970: 199-210.
- 1972. Ant fauna of the Mt. Kirishima Area. In KATO, M., (ed.), Annual report of JIBP/CT-S for the fiscal year of 1971: 176-182. (In Japanese with English summary.)
- 1973. Ant fauna of the Scsoko Island, Okinawa. *Sesoko Mar. Sci. Lab. Tech. Rep.*, (2): 15-16.
- 1977 a. Ant fauna of Miyagi Prefecture, Japan. *Jap. J. Ecol.*, **27**: 111-116.
- 1977 b. Formicidae of Japan (3). Genus *Formica* LINNAEUS. *Ari*, (8): 1-2. (In Japanese.)
- & G. M. DLUSSKY, 1977. On two ant species of the genus *Formica* (Hymenoptera, Formicidae) from Japan. *Kontyû, Tokyo*, **45**: 23-25.
- TANAKA, M., 1974. A new species of the ant genus *Ponera* from Yaku Island. (Hymenoptera, Formicidae). *Ent. Rev. Japan*, **27**: 32-36.
- TAYLOR, R. W., 1967. A monographic revision of the ant genus *Ponera* LATREILLE (Hymenoptera: Formicidae). *Pacif. Ins. Mon.*, **13**: 1-112.
- 1978. *Nothomyrmecia macrops*: a living-fossil ant rediscovered. *Science*, **201**: 979-985.
- TERANISHI, C., 1915. A new species of Formicidae from Japan. *Kontyûgaku Zasshi*, **1**: 137-138.
- 1917. Rare ants collected by Mr. Mitsuharu AZUMA. *Seikô*, (1): 8-10. (In Japanese.)
- 1924. Three rare hymenopterous insects from Hokkaido and Honshu. *The Insect World*, **28**: 52-54. (In Japanese.)
- 1927 a. Ants in the hothouse of Tennouji Plant Garden, Osaka. *Kontyû, Tokyo*, **2**: 51-52. (In Japanese.)
- 1927 b. The distribution of the ant *Tetramorium guineense* (FABRICIUS). *Ibid.*, **2**: 123-125. (In Japanese.)
- 1927 c. Notes on Japanese ants. 1. Aberrant forms. *Zool. Mag.*, **39**: 88-94. (In Japanese.)
- 1928. *Paratrechina* (*Nylanderia*) *longicornis* (LATREILLE) and *Monomorium* (*Monomorium*) *pharaonis* (LINNAEUS). *Kontyû, Tokyo*, **2**: 241-242. (In Japanese.)
- 1929 a. Japanese ants, their behavior and distribution (I). *Zool. Mag.*, **41**: 239-251. (In Japanese.)
- 1929 b. Japanese ants, their behavior and distribution (II). *Ibid.*, **41**: 312-332. (In Japanese.)
- 1929 c. Okinawan ants intruding into a dwelling. *Kontyû, Tokyo*, **3**: 41-42. (In Japanese.)
- 1932. A list of the ants of Sakhalin. *Trans. Kansai Ent. Soc.*, (3): 49-54. (In Japanese.)
- 1933 a. Japanese ants, their behavior and distribution (III). *Ibid.*, (4): 77-80. (In Japanese.)
- 1933 b. A list of ants found at the sand dune of Tottori. *Ibid.*, (4): 84-85. (In Japanese.)
- 1940. Works of Cho TERANISHI, posthumous section. 95 pp. TOSAWA, S., (ed.), Osaka.
- VIEHMEYER, H., 1922. Neue Ameisen. *Arch. Naturg.*, **88**: 203-220.
- WEBER, N., 1947. A revision of the North American ants of the genus *Myrmica* LATREILLE with a synopsis of the palearctic species. I. *Ann. Ent. Soc. Amer.*, **40**: 437-474.
- WHEELER, W. M., 1906. The ants of Japan. *Bull. Amer. Mus. Nat. Hist.*, **22**: 301-329.

- WHEELER, W. M., 1909 a. Ants collected by Prof. F. SILVESTRI in the Hawaiian Islands. *Boll. Lab. Zool. Gen. Agrar. Portici*, 3: 269-272.
- 1909 b. Ants of Formosa and the Philippines. *Bull. Amer. Mus. Nat. Hist.*, 26: 333-345.
- 1910. An aberrant *Lasius* from Japan. *Biol. Bull.*, 19: 130-137.
- 1914. *Formica exsecta* in Japan. *Psyche*, 21: 26-27.
- 1923. Chinese ants collected by Professor S. F. LIGHT and Professor A. P. JACOT. *Amer. Mus. Novitates*, (69): 1-6.
- 1928 a. Ants collected by Professor F. SILVESTRI in Japan and Korea. *Boll. Lab. Zool. Gen. Agrar. Portici*, 21: 96-125.
- 1928 b. Ants collected by Professor F. SILVESTRI in China. *Ibid.*, 22: 3-38.
- 1929. Some ants from China and Manchuria. *Amer. Mus. Novitates*, (361): 1-11.
- 1933 a. Three obscure genera of ponerine ants. *Ibid.*, (672): 1-23.
- 1933 b. New ants from China and Japan. *Psyche*, 40: 65-67.
- WILSON, E. O., 1955. A monographic revision of the ant genus *Lasius*. *Bull. Mus. Comp. Zool.*, 113: 1-201.
- & R. W. TAYLOR, 1967. The ants of Polynesia (Hymenoptera: Formicidae). *Pacif. Ins. Mon.*, 14: 1-109.
- YAMAUCHI, K., 1979. Taxonomical and ecological studies on the ant genus *Lasius* in Japan (Hymenoptera: Formicidae). I. Taxonomy. *Sci. Rep. Fac. Educ. Gifu Univ. Nat. Sci.*, 6: 147-181.
- & K. HAYASHIDA, 1970. Taxonomic studies on the genus *Lasius* in Hokkaido, with ethological and ecological notes (Formicidae, Hymenoptera). II. The subgenus *Lasius*. *Jour. Fac. Sci. Hokkaido Univ. Ser. VI, Zool.*, 17: 501-519.
- YANO, M., 1910. On the ants of Japan. *Zool. Mag.*, 22: 416-425. (In Japanese.)
- 1911. A new slave-making ant from Japan. *Psyche*, 18: 110-112.
- 1912. Slave-making ants and their relatives in Japan. *Zool. Mag.*, 24: 121-130. (In Japanese.)
- 1932. Family Formicidae. In *Nippon Kontyû Zukan*: 328-340. Hokuryukan, Tokyo. (In Japanese.)
- YARROW, I. H. H., 1954. The British ants allied to *Formica fusca* L. (Hym., Formicidae). *Trans. Soc. Brit. Ent.*, 11: 229-244.
- 1955. The type species of the ant genus *Myrmica* LATREILLE. *Proc. R. Ent. Soc. Lond. (B)*, 24: 113-115.
- YASUMATSU, K., 1940. Matériaux pour servir à la faune myrmécologique des îles de Yaeyama. *Mushi, Fukuoka*, 13: 67-70.
- 1941. On the ants of the genus *Dolichoderus* of Angaran element from the Far East (Hymenoptera, Formicidae). *Kontyû, Tokyo*, 14: 177-183. (In Japanese.)
- 1950. Discovery of an ant of the genus *Lordomyrma* EMERY in eastern Asia (Hym.). *Ins. Matsumurana*, 17: 73-79.
- 1960. The occurrence of the subfamily Leptanillinae in Japan (Hymenoptera, Formicidae). *Esakia*, (1): 17-20.
- 1962. Notes on synonymies of five ants widely spread in the Orient (Hym.: Formicidae). *Mushi, Fukuoka*, 36: 93-97.
- & W. L. BROWN, Jr., 1951. Revisional notes on *Camponotus herculeanus* LINNÉ and close relatives in Palearctic regions (Hymenoptera: Formicidae). *Jour. Fac. Agr. Kyûshû Univ.*, 10: 29-44.
- & Y. MURAKAMI, 1960. A revision of the genus *Stenamma* of Japan (Hym., Formicidae, Myrmicinae). *Esakia*, (1): 27-31.
- YOSHIOKA, H., 1939. A new ant of the genus *Dolichoderus* from Japan. *Trans. Kansai Ent. Soc.*, 8: 70-71.

\* I was unable to see these literature, which have been cited from CHAPMAN & CAPCO (1951), BARONI URBANI (1971) [Catalogo delle specie di Formicidae d'Italia. *Mem. Soc. Ent. Ital.*, **50**: 5-287.], BROWN (1975), KEMPF (1972) [Catálogo abreviado das formigas da Região Neotropical (Hymenoptera: Formicidae). *Studia Ent.*, **15**: 3-344.], and Zoological Record, etc.

### Postscript

1) Recently I have been informed the presence of AZUMA's publication by Mr. M. KUBOTA to whom I am very grateful. AZUMA in 1977 described *Leptothorax* (*Leptothorax* [!]) *arimensis* as a new species. I do not know whether that name is valid. However, at least, the availability of that name may be doubtful. The distinction of *L. arimensis* from *spinosior* and *congruus* (that AZUMA made) does not make believe *arimensis* as new to science, because *arimensis* seems to more closely resemble *eburneipes*, *galeatus*, or *argentipes* described from China by WHEELER in 1927 or 1928 than *spinosior* or *congruus*.

2) I have missed one form recorded from Japan. Insert the following statement immediately before No. 21 under the subfamily Myrmicinae in the list A: "*Myrmica kasczenkoi* RUZSKY, 1905: 702. [COLLINGWOOD, 1976: 302.]".

### Additional References

- AZUMA, M., 1977. On the myrmecological-fauna of Mt. Rokko, Hyogo, with description of a new species (Formicidae, Hymenoptera). *Hyogo Biology*, **7**: 114-116. (In Japanese with English description of a new species.)
- COLLINGWOOD, C. A., 1976. Ants (Hymenoptera, Formicidae) from North Korea. *Ann. Hist.-nat. Mus. Nat. Hung.*, **68**: 295-309.
- \*RUZSKY, M. D., 1905. Formicarii Imperii Rossici. *Arb. Naturf. Ges. Kais. Univ. Kasan*, **38** (4-6).

# Errata

page	line	Reads:	Change to:	possibility
197	23	39. <i>Pheiodle fervida</i>	39. <i>Pheidole fervida</i>	P
197	24	40. <i>Pheiodle indica</i>	40. <i>Pheidole indica</i>	P
199	23	113. <i>Acropyga</i> ( <i>Rhizomyrma</i>	113. <i>Acropyga</i> ( <i>Rhizomyrma</i>	A(half)
200	27	= <i>Forica fusca</i>	= <i>Formica fusca</i>	A
207	11	——1886. Études	——1886. Études	P
208	43	*——1866b. Diganosen	*——1866b. Diagnosen	P
209	1	..... Shinkonthu,	..... Shinkontyu,	A
209	12	..... (In Russian)	..... (In Russian.)	P
209	18	..... 284-286.	..... 284-286,	P
210	2	..... of nes species...	..... of new species...	P
212	1	...see these literature,	...see these references,	E
212	19	..... 7:114-116. ....	..... 7:112-118. ....	A(half)

(When correction was not made in spite of the author's indication in the galley proof, I regarded that the printer is responsible for the misprint.)

K. Onoyama. 1980.08.19.